tions which were being made, apparently by Dr. Simpson, at McMurdo Sound. It is, indeed, probable that the systematic meteorological, magnetic, and physical work may yield the most important results of the expedition; for records were made at two stations, and the weather conditions appear to have been very different from those of the previous seasons during which expeditions have wintered beside the Ross Sea.

The biological collections should also prove very valuable. The material obtained by the seven hauls of the deep-sea trawl will probably contain many new species and interesting additions to the Antarctic fauna. The line of soundings made by the *Terra Nova* to the south of New Zealand is also an important contribution to the ocean contours of that area.

Apart from the oceanographic work, perhaps the most interesting geographical information in the despatches is that dealing with the meteorology. Unlike the calms and fine weather experienced by Amundsen in his more easterly route, Captain Scott was harassed by a succession of southern gales similar to those met by Shackleton, although the weather on the plateau appears to have been milder. It has been suggested that the low temperature of these southern winds indicated their anticyclonic origin, but as Captain Scott reports for one of them a temperature of only 35°, they do not support the existence of the hypothetical south polar anticyclone. The *Discovery* expedition reported a very slight snowfall in the area around the Ross Sea, and the recent diminution of the glaciers was thus explained. The evidence collected by that expedition was recognised at the time as inconsistent with that conclusion, and the heavy snowfalls now reported show that there is no difficulty in explaining the formation of the barrier ice by the accumulation of snow.

The reports show that the expedition has made most important contributions to Antarctic knowledge. Subjoined is a summary of the scientific results published by the Central News (Ltd.) Agency.

Summary of Scientific Results.

The general plan arranged for the scientific work of the expedition has been carried out so far almost in its entirety. The self-registering meteorological instruments have given a continuous record of pressure and temperature and of wind velocity and direction. These have been checked by the eye every four hours. The upper atmosphere has been investigated by means of small balloons, which have shown the direction of the upper currents of the air to a height of six miles and have recorded temperatures to a height of five miles. Absolute magnetic observations have been made every week. Self-registering magnetic instruments were installed in a room excavated in the side of a small glacier, this eliminating the changes of temperature which are a serious cause of error in this class of work. All through the winter the aurora was observed every hour, but very few brilliant displays occurred. Atmospheric electricity has also been studied, and ice work and physiography have afforded much fieldwork.

Vexed problems regarding the origin of Alpine topography when Europe and other temperate regions were undergoing an ice age are being studied in the examples offered by the retreating glaciers of Victoria Land, where the ice age still obtains. The mainland offers a rich field for petrology, with an abundance of mineral-bearing quartz veins, but none of any economic value.

Specimens of coal of economic value and well-preserved fossils have been found near Granite Harbour. An excellent field exists at winter quarters for ice work in miles of glacier, while in front of the hut stands a cape formed largely of massive moraine with lava flows from Erebus. Pendulum observations for the value of gravity have been carried out; a tide gauge has given a continuous record, and marine biological work has been done throughout the winter at a hole kept open in the sea ice for nets, water samples, and sea temperatures.

The quantitative and qualitative observations of minute organisms at various seasons are giving interesting results. The parisitology of all seals, penguins, and others birds and fish available has already given good results. Some new protozoa have been found.

The above has fully occupied the time of the scientific staff and indicates that there is an ample field for further research in every direction.

Successful biological work has been carried out on board the ship. With seven trawls a large collection of the deep-sea fauna of the Antarctic has been obtained. A number of catches with the tow net have been secured which show a vertical distribution in the transparent floating organisms of the sea. Continuous meteorological observations have been taken in the ship, linking up Australasia with Antarctica.

Natural history research has been greatly assisted by the use of the kinematograph. Many thousands of feet of film have been used in securing permanent animated records of the interesting bird and animal life of these regions, and every phase of seal, penguin, and skua-gull life has been thus illustrated. Some remarkable kinematograph films have been secured showing for the first time the "Killer" whale, the wolf of the seas, in its native element.

NOTES.

We notice with regret the announcement of the death on March 8, in his seventy-fifth year, of Dr. Edward Divers, F.R.S., the distinguished chemist, and Emeritus professor of chemistry in the Imperial University, Japan.

At a meeting of the committee of the Lawes Agricultural Trust held on March 30, Mr. A. D. Hall, F.R.S., director of the Rothamsted Experimental Station, tendered his resignation. Mr. Hall's resignation takes effect in September, after which he will give his whole time to the work of the Development Commission. The committee of the Lawes Agricultural Trust will proceed to the election of a new director in June.

The Philosophical Institute of Canterbury, New Zealand, which came into existence on August 30, 1862, will celebrate its jubilee this year. It is proposed to mark the occasion by holding a gathering in Christchurch.

The council of the New Zealand Institute, at its annual meeting, held in Christchurch at the end of

January this year, decided to award the Sir James Hector memorial medal and prize to Dr. L. Cockayne as the investigator, working in New Zealand, who has done most to advance botanical science.

A seismological Observatory has been added to the Geological Department of the Georgetown University, Washington, D.C., U.S.A. The equipment consists of two Bosch-Omori tromometers of 25 kilos. mass, a Wiechert horizontal pendulum of 200 kilos. mass, two Mainka conical pendulums of 130 kilos. mass each, and a vertical pendulum of 80 kilos. mass, after Wiechert. A separate cave, fitted with a Bosch photographic recording horizontal pendulum, is under construction.

The sixty-fourth annual meeting of the Cotteswold Naturalists' Field Club was held at Gloucester on April 2. Dr. C. Callaway and the Rev. Canon Razeley were elected honorary members. The retiring president, Mr. William Crooke, after reviewing the work of the club during the past year, dealt with the evidence for the antiquity of man that had been obtained of recent years. The Rev. Walter Butt, J.P., was elected president for the coming year, and Mr. L. Richardson hon. secretary.

On Thursday next, April 18, Prof. A. W. Crossley will deliver the first of two lectures at the Royal Institution on "Synthetic Ammonia and Nitric Acid from the Atmosphere." The Friday evening discourse on April 19 will be delivered by Mr. Alan A. Campbell Swinton on "Electricity Supply: Past, Present, and Future," and on April 26 by Sir George H. Darwin on "Sir William Herschel." In addition to the Friday evening arrangements already announced, the discourse on May 24 will be delivered by Mr. A. D. Hall on "Recent Advances in Scientific Agriculture: the Fertility of the Soil," and on June 14 by Mr. A. H. Savage Landor on his recent journey through unknown parts of South America.

By the will of Lord Lister, the sum of 20,000*l.* is bequeathed to the Lister Institute of Preventive Medicine, and 10,000*l.* each to the Royal Society, King Edward's Hospital Fund, King's College Hospital, and the North London and University College Hospital. In the will Lord Lister requests his nephews, Mr. Rickman John Godlee and Mr. Arthur Hugh Lister, to arrange his scientific MSS. and sketches, destroying or disposing of such as are of no permanent scientific interest, and to present the remainder to the Royal College of Surgeons, England. Lord Lister's orders and medals are bequeathed to the Edinburgh University, and the will states:—"I expressly declare that it is my intention that the University authorities for the time being shall be perfectly at liberty to dispose of all or any part of the gift—for example, by having the medals melted down or the diplomas or other writings destroyed—at any time and in any manner that may seem to them desirable."

The Essex Field Club has recently appointed a committee for the purpose of raising a small fund to put in order the tombs of John Ray and Benjamin Allen (which stand adjacent to one another in the churchyard at Black Notley, but have been allowed to fall into disrepair), and to erect at Braintree a memorial to Samuel Dale, of that town, to whom no memorial exists. These three naturalists were friends and contemporaries, living at Braintree or in its immediate vicinity in the closing years of the seventeenth century and the opening years of the eighteenth. John Ray (1627–1705) was by far the most eminent British naturalist of his day, and has been rightly described as "the Father of Modern Natural Science." Samuel Dale (1659–1738), though a younger man and of less eminence, was widely known in his day as a naturalist, especially as a botanist. Dr. Benjamin Allen (1663–1738), the youngest and least eminent of the trio, was an excellent naturalist and a skilled physician. For carrying out the work of restoring the two tombs, and erecting a memorial to Dale, the sum of about 50*l.* is required, and subscriptions are invited to make up this amount. Such subscriptions may be sent to Mr. Miller Christy (115 Farringdon Road, E.C.), or the Rev. J. W. Kenworthy (26 Inglis Road, Colchester).

The one hundredth anniversary of the foundation of the Academy of Natural Sciences of Philadelphia was celebrated on March 19–21. The actual date of the anniversary was March 21, but the celebration began on the evening of March 19, when delegates to the number of 133, who had been appointed by corresponding societies to represent them, were welcomed by the Hon. Rudolph Blankenburg, mayor of Philadelphia. After the delegates had presented their letters of credential and congratulation, the president delivered an historical address setting forth the early struggles of the society for existence, alluding briefly to the distinguished men whose work had prepared the way for the celebration, directing attention to the special features of the museum, and insisting on the importance of natural history studies in their utilitarian aspect, more especially in connection with the parasitic origin of disease. In conclusion, he handed over to the society on behalf of the building committee the enlarged hall of the Academy, which, through the liberality of the Legislature of the State, had received important additions and had been made thoroughly fireproof during the past year. The works to be issued in connection with the centenary celebration consist of a quarto volume of illustrated scientific memoirs, the commemorative volume, an index to the entire series of Proceedings and Journal, and a detailed history of the Academy by the recording secretary, Dr. E. J. Nolan. At the sessions on March 20 and 21, summaries were given of communications presented for publication in the commemorative volume, and of other papers on scientific subjects. The scientific sessions concluded with a lecture by Mr. Witmer Stone, one of the curators of the Academy. On the evening of March 21, 163 members and guests sat down to a banquet in the new geological hall, formerly occupied by the library. The banquet, in common with all the other details of the programme, was a brilliant success, and the entire celebration will be long remembered as one of the most interesting events in the history of American science.

The alleged traces of primitive man in Argentina, the *tierras cocidas* of Monte Hermoso, have been often referred to in these pages. The views of the late Florentino Ameghino have found a supporter in Colonel A. A. Romero (*Anales del Mus. Nac. de Buenos Aires*, vol. xxii., 1911, p. 11). It is argued that we know little of man's precursors, that they may go back to a high antiquity, and that the grouping of the "scoriæ" sometimes suggests a united camp-fire. The petrographic arguments now adduced, and the very defective photographs of thin slices, do not add much to the discussion. The scoriaceous earths containing vegetable remains, as shown in plate viii., are much more to the point, as opposing a volcanic origin.

In the Journal of the College of Agriculture, Imperial University of Tokyo, vol. ii., No. 7, Mr. Kamakichi Kishinouye describes an interesting collection illustrating prehistoric fishing in Japan. This collection was made from a large series of shell-mounds of the Neolithic period, associated with numerous flint implements, pottery, the hard parts of molluscs, fish, turtle, birds, marine, and land mammals. The fishing implements are of the most varied description, including stone arrow and harpoon heads, others of bone or horn, sinkers, &c. In their form they closely resemble implements of the same period found in these islands. The fishing-hooks have usually barbs on the outer side of the stem. One fine landing-hook or gaff, the only example found, is made of horn, about 130 mm. in length, and bent in the middle at an angle of about 90°. This prehistoric race seems to have possessed little of the artistic capacity of their successors, but some clay dishes bear representations of *haliotis* or *anodonta* shells, and on another appears a design which may represent the head of a shark. This valuable paper is accompanied by excellent illustrations of typical specimens.

Parts iii. and iv. of vol. viii. of *Biometrika* have been issued together as a double number. Of the principal articles three—on Egyptian, negro, and pygmy crania respectively—deal with craniology; the two former are from the pen of Miss H. Dorothy Smith, the latter edited by Prof. Pearson from the work of the late Dr. Crewdson-Benington. Mr. Carr Saunders discusses the relation between pigmentation and disease on the basis of data derived from the medical survey of school children at Birmingham, but, unlike earlier workers in the same field, such as Shrubsall and Macdonald, fails to find any appreciable relation. Of the remaining articles we may specially direct attention to three, by Dr. Maynard and Prof. Pearson, bearing on the interpretation of data relating to the appearance of multiple cases of disease in the same house. The supplementary tables calculated by Mr. Everitt for facilitating the determination of Prof. Pearson's coefficient for a fourfold table should also be mentioned.

A new "quarterly review of scientific thought," with the somewhat imposing title of *Bedrock*, has been launched on its career this month by Messrs. Constable. Of the articles included in the first number, several are distinctly noteworthy. Prof. Welton discusses the value, to the teacher and to the scientific worker, of a logic of method, and his comments on teaching should prove useful and stimulating. The good teacher, says Prof. Welton, shows his pupil how to go along the high road; the old-fashioned bad teacher plumped him down at his destination, as if he had been transported there on a magic carpet; the bad new-fashioned teacher turns him adrift, giving him no indication of the way. Dr. Archdall Reid contributes a characteristic discussion of recent researches in alcoholism, and the reader will find it interesting to follow this by a perusal of Dr. Gossage's article on "Human Evidence of Evolution." Prof. Poulton's examination of the facts of mimicry as a crucial test between the theories of Darwin and of Bergson is both admirable and timely, but would have been more easy to follow if the publishers could have seen their way to give the illustrative plates in colour instead of in black and white. The articles on "Interaction between Passing Ships," by Prof. Gibson, and on "The Stars in their Courses" (substantially the Halley lecture) by Prof. Turner, take the reader into different fields of thought, and are both written in a simple and attractive style. Altogether the new quarterly opens well.

The report of the Rugby School Natural History Society for 1911 records the retirement of its late president, Mr. Henderson, one of whose last official acts was the inauguration of the successful exhibition held in March of the year under review. The astronomical section, which lapsed a few years ago, has been revived, and is doing well, but in the zoological section (which appears to be restricted to ornithology, entomology forming a section by itself) the secretary deplores the lack of enthusiasm displayed by the members.

Two unusually interesting new mammals from Tonkin were described at the meeting of the Zoological Society on March 19. The first was a civet resembling the banded *Hemigale hardwickei* of the Malay countries in colouring, but distinguished by the spatulate crowns of its milk-incisor teeth—a difference which its describer, Mr. Thomas, regards as of generic value. The second, described by Mr. Dollman, was a snub-nosed monkey of the genus Rhinopithecus, of which three species, from western and central China and the Mekon valley, were previously known.

The insects causing damage to the chir pine (*Pinus longifolia*) in the north-west Himalaya form the subject of vol ii., part 2, of the Indian Forest Memoirs. The timber of the chir is much used for a variety of purposes in India, owing to the ease with which it is worked, and the tree is also tapped for resin, as a source of turpentine. The long list of insect pests by which this tree is attacked given by E. P. Stebbing shows how sorely it stands in need of protection, one of the worst of these being the beetle *Platypus wilmoti*, the larvæ of which bore into the very heart of the timber. Special attention is directed to the insects parasitic on, or preying upon, the mischievous species.

IN the *Journal of Genetics*, vol. ii., No. 1 (February), Mr. A. W. Hill deals with the history of *Primula obconica* under cultivation, and concludes that the amelioration and development in form and colour of the flowers, &c., which have taken place during the past thirty years, must be attributed to selective processes, also that there is not sufficient evidence in favour of the view that hybridisation with other species has taken place. It is of the greatest importance that the history of other species which are made the object of extensive breeding experiments should be thoroughly cleared up, as in this paper, which is illustrated by two beautiful coloured plates.

THE difficult problem of the morphological nature of the endosperm of angiospermic plants forms the subject of a paper by Prof. Coulter in the *Botanical Gazette,* vol. lii., No. 5. From a critical review of the literature, the author concludes that endosperm formation is not dependent upon the presence of a male nucleus, nor even upon fusion of the two polar nuclei of the embryo-sac, hence these fusions may be regarded as supplementary rather than determinative. Further, the formation of endosperm does not even depend upon having been preceded by a reduction division. The author is therefore led to the view that the fusions associated with endosperm formation do not represent a definite process, but are miscellaneous in number and order; and that the product of such fusions as do occur is merely an undifferentiated tissue, which practically continues the tissue of the gametophyte, that is, it is simply *growth* and not *organisation.*

THE concentric growths of chalcedonic silica known as beekite appear as disease-spots in fossil shells, and have spread in some cases until the organic remains are replaced by lumpy masses of silica. Mr. James Strachan brings his considerable experience as a chemist to bear on the origin of beekite in a paper read before the Belfast Naturalists' Field Club on March 27. He concludes that the chalcedony is precipitated by osmotic action in the colloid matter of the shells, where it replaces calcium carbonate. The rings around the central disc of chalcedony represent the periodic movement of the chemical action. Mr. Strachan points out that this mode of origin has been suggested by Prof. Sollas for banded flints. It will be noticed that, if animal matter is requisite for the precipitation, the formation of beekite is referred to an early stage in the history of the rocks in which it occurs.

THE views of Lugeon and others as to Alpine mountain-structure have been so widely accepted that Mr. Bailey Willis probably does good service by a criticism based on personal observations. In a "Report on an investigation of the geological structure of the Alps" (Smithsonian Miscell. Coll., vol. lvi., No. 31, 1912), he urges the efficacy of thrust-planes as against recumbent overfolds, and shows how the exotic masses of strata known as *klippen* may be explained by the intersection of two thrust-planes of opposite slope. He believes that the earlier thrusting in the Alps came from the north-west, and was followed by erosion carried on until a mature type of surface had been produced. The far more recent thrusting from the south-east is regarded as Pliocene, since the scarp weathered out in the Bernese Oberland on the Alpine mass that was moved forward remains still fresh and young. This short paper clearly gives matter for large discussion. The spelling of some of the place-names seems to want revision.

AN important memoir on the climate of the Italian capital has been issued by the Italian Meteorological Office. Rome is one of the few places for which meteorological observations extending over more than 100 years are available. In this volume Dr. F. Eredia has gathered together and summarised the available data. For all the principal elements monthly means or totals are given for each year from the commencement of the record up to the end of 1910, the whole forming a historical record of great importance. The observations of precipitation go back to the year 1782 in unbroken sequence. The temperature record also begins in 1782, but there is a gap in the series from 1792 to 1811. Monthly normal values have been computed for all elements, and for pressure temperature, humidity, and wind velocity the diurnal variation has been determined from the records of autographic instruments. The observations are not strictly homogeneous throughout. There have been changes of site, instruments, and methods of observing, but in preparing the results for publication every effort has been made to minimise the effects of such disturbing causes.

THE Danish Meteorological Institute has distributed (as in previous years) an excerpt from its nautical meteorological year-book, containing useful information relating to the state of the ice in the Arctic seas in 1911; the monthly summaries for April–August are illustrated by maps. The details seem to us to show that the conditions were, on the whole, somewhat more severe than usual. At the entrance to the White Sea there was much pack-ice in April and May, and Archangel was closed until near the end of the latter month. Novaia Zemlia was not ice-free until comparatively late, and in Barents Sea the ice was more closely packed than usual; the west coast of Spitsbergen became clear in August, but round the north-east coast navigation was impracticable during the year. On the east coast of Greenland there was more ice than usual during the summer, but at Angmagsalik the sea was open unusually early. In Baffin Bay it was difficult to penetrate the ice throughout the summer. So few reports were received from Bering and Beaufort Seas that it was difficult to form a general opinion; in May and June, however, the conditions seem to have been normal.

IN the *Zeitschrift des Vereines deutscher Ingenieure* Dr. Th. von Kármán, of Göttingen, shows that the ordinary theory of the flexure of beams cannot be applied to cylindrical tubes of small thickness owing to the considerable changes which take place in the form of the cross section when the tubes are bent. The author gives formulæ which take this effect into account, and it is found, both from theory and from experiment, that in certain cases the deflection may be from three to five times as great as that given by the usual EI/ρ formula.

In the case of sudden explosions or volcanic eruptions anomalous sound phenomena frequently occur, the noise of the explosion being sometimes heard at abnormal distances, while it is inaudible at other places nearer the source. These phenomena were discussed in 1910 by Dr. G. v. d. Borne. In the Proceedings of the Tokyo Mathematico-Physical Society, vi., 9, Mr. S. Fujiwhara gives an analytical investigation based on a formula for the velocity potential subject to the assumptions that the atmospheric density follows the adiabatic law, and that the wind velocity varies very slowly with the height, the velocity of sound thus varying with the altitude.

In Blatt 4, 1911, of the Royal Observatory of Wilhelmshaven, in continuation of similar previous work, Prof. Bidlingmaier gives a graphical representation of the hourly magnetic character of the last half of 1911, based on a scale "0," "1," "2," of disturbance. As an extension, he develops a scale of magnetic "activity," ultimately dependent on the range of the magnetic elements in each hour. If this lies between $50(n-1)\gamma$ and $50n\gamma$, the measure of the activity is $n^3-(n-1)^3$. This idea is applied to the ten years 1890 to 1899, and conclusions are drawn as to the activity of the earth's horizontal magnetic field in the several years.

In his Nobel lecture to the Academy of Sciences at Stockholm in December last, now issued by Messrs. Barth, Leipzig, Prof. W. Wien gave a valuable survey of the recent advances made by the theory of radiation and of the difficulties which still beset it. Lord Rayleigh's form of the law of radiation of a black body, based on the equal distribution of the energy amongst the degrees of freedom of the vibrating system, agrees with observation over the longer wave-lengths only. Prof. Wien's formula, based on his "law of displacement" or compression of radiation, agrees, on the other hand, with measurements over the shorter wave-lengths only. Prof. Planck's form of the law agrees with observation over the whole of the range of wave-lengths at present available, but rests on the conception of energy as atomic in structure. The difficulties which such a conception raises are very grave, and Prof. Planck himself has substituted continuous for discontinuous absorption of radiation (see these "Notes" for March 16, p. 90, and June 15, p. 528, 1911), while Sir Joseph Larmor devoted his Bakerian lecture in 1909 to a possible alternative. Prof. Einstein's attempt to bring Dulong and Petit's law of atomic heats under Planck's theory has met with partial success only, and Prof. Wien thinks the processes going on in the atoms themselves must be taken into account before the theory of radiation can be placed on a satisfactory footing. A commencement has already been made by Prof. Sommerfeld, who gives the constant h of Planck's theory an atomic significance.

An interesting series of papers on the chemical effects of light on organic compounds appears in the *Gazzetta chimica Italiana* (vol. xlii., p. 65 *et seq.*). In the first paper, by Prof. Paternò and C. Maselli, the synthesis is described of a substance having alkaloidal properties, by exposing acetophenone dissolved in alcoholic ammonia to bright sunlight during several months. The alkaloid $C_{18}H_{18}N_2$ forms well-defined measurable crystals, and appears to owe its origin to a complex change in which two molecules of acetone, two of ammonia, and one of alcohol are involved. In the absence of light the alkaloid is not formed. In the later papers, by L. Mascarelli, a striking change brought about in aromatic aldehydes by traces of iodine under the influence of sunlight is dealt with. It has been known for some years that benzaldehyde polymerises to trimeric and tetrameric forms under the influence of the sun's rays; it is now shown that in the presence of traces of iodine a dimeric form is produced which has the structure of benzyl benzoate. There has, in fact, been reduction of a portion of the benzaldehyde at the expense of the remainder, a result similar to that well known to be induced by the action of alkalies, such as potassium hydroxide.

In the January number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale,* M. H. Gault gives a summary of the additions which have been made during the last few years to our knowledge of natural perfumes and other essential oils. Among the principal oils dealt with are those of cloves, eucalyptus, fennel, juniper, geranium, jasmine, lavender, lemon grass, and peppermint. The article is a continuation of one on the same subject published in 1908. Various sources have been drawn upon for the information, Schimmel's "bulletins" figuring frequently in the references, which include also a fair number of English and American periodicals. A short account of the origin of each oil is given, with particulars of its physical and chemical characters, including its density, boiling point, refractive index, rotatory power, saponification value, and so on; usually also the chief chemical components are indicated. Special points in the chemistry of individual oils are discussed incidentally, but the author reserves for a future article the more general consideration of the chemical constituents of essential oils, as well as a fuller discussion of certain researches. To those interested in the subject the contribution will be useful as a convenient *résumé* of investigations, the accounts of which have been disseminated hitherto over a number of publications.

Bulletin No. 52 of the University of Illinois contains an account of investigations of the strength of rolled zinc carried out by Mr. Herbert F. Moore. From the results it appears that zinc, either rolled or cast, has no well-defined yield point, and its elastic limit is very low. Zinc possesses a relatively high degree of plasticity. The ultimate strength of thin rolled zinc plate (not more than 0·05 inch thick) is about 24,000 lb. per sq. in. The modulus of elasticity of zinc in tension is about 11,500,000 lb. per sq. in. The stress per square inch of area sheared developed in punching or shearing rolled zinc plates is about 40 per cent. of the stress developed in punching or shearing mild steel plates; the energy required in punching or shearing rolled zinc plates is about 30 per cent. of the energy required to punch or shear mild steel plates. The ductility of rolled zinc is much less than that of mild steel, and the ductility of zinc plate with the grain is greater than the ductility across the grain.

IN the new Liverpool Adelphi Hotel of the Midland Railway Company, which was opened a few days ago, uniform and accurate time is secured throughout by an installation of upwards of 200 electrical impulse dials on the "Synchronome" system, all operated by one controlling pendulum. It is necessary that electric clocks in bedrooms should be silent in action, and this condition is fulfilled by those on the "Synchronome" system.

PROF. KAMERLINGH ONNES directs our attention to an error in our note of March 14 (p. 41) on his measurements of the resistance of mercury at low temperatures. The values there given are not resistivities, but the resistances of a wire of solid mercury.

OUR ASTRONOMICAL COLUMN.

THE ECLIPSE OF APRIL 17.—Anyone intending to see the eclipse of the sun from a station on the central line as it crosses France will find several points of interest in M. Fayet's article in the *Revue Scientifique* for March 30.

After explaining eclipses in general, M. Fayet describes the conditions of the coming eclipse, and illustrates his description with several maps and diagrams; he also gives numerous tables of position angles, times, &c., for many stations in France. It would appear that a total eclipse is not likely to be seen in France, and in any case spectrographic and any long-exposure work are out of the question; but M. Fayet shows that from the point of view of geometrical astronomy the eclipse is a most important one, giving exceptional facilities for delicate determinations of the moon's place, the apparent size of the moon, and the figure of the earth. There are, then, plenty of possibilities of a large number of amateurs making observations of great value, even if the eclipse is only an annular one; no expensive instruments will be necessary, and the value of the observations will be greatly enhanced as they are multiplied in number. In France the observers are being officially organised, and preparations are being made for the distribution of the exact time and the coordination of the results. St. Germain-en-Laye, a few miles west of Paris, would appear to be one of the most readily accessible points near to the central line.

In the *Comptes rendus* (No. 14) for April 1 M. Bigourdan discusses very clearly, and explains in detail, the observations which may be made for the better determination of the moon's apparent diameter and position, and the reasons for making them during this particular eclipse.

THE EL NAKHLA EL BAHARIA METEORITE.—The meteoritic fragments which fell in Lower Egypt on June 28, 1911, are described in detail by Dr. John Ball in Survey Department Paper No. 25. Altogether some forty stones, weighing nearly 10 kgms., have been collected, but, as the explosions producing the fragments are supposed to have taken place at a considerable altitude, scattering the pieces over an area about 4·5 kms. in diameter, this probably does not represent the total mass as it entered the earth's atmosphere. The weight of the heaviest fragment is 1,813 grams, and of the smallest about 20 grams; some small fragments have a fused skin all over their surfaces while others are only partially covered, thus indicating a succession of explosions. A portion of the stone was submitted to Sir Norman Lockyer for spectroscopic analysis, and his report places the spectroscopic prominence of the various elements in the order Cr, Na, Ca, Al, Mg, Si, Mn, Fe, V, Ti, and K; the last is very weak. A chemical analysis by Mr. W. B. Pollard gives SiO_2, 50; FeO, 20; CaO, 15; MgO, 12; and Al_2O_3, 1·65 per cent.; Cr_2O_3 appears as 0·23 per cent., and traces of the other elements were found. Although this is the first "find" in Egypt, Dr. Ball believes that a large meteorite fell in a direction 32° W. of true N. from Philæ on April 5, 1902; such phenomena as attend these falls were then observed, but no stone was found.

A DAYLIGHT METEOR.—The director of the Meteorological Office informs us that at Brocklesby, Lincs, on March 28, Mr. F. J. Gibbons observed a vivid meteor at 2.50 p.m. in broad daylight on a bright afternoon. The meteor appeared to move from south to east in a downward course. It would be interesting to know if the meteor was observed elsewhere. Observations of meteors in daylight appear to be uncommon, although particulars of a certain number are given in the annual reports of the British Association Committee on luminous meteors.

THE STONYHURST OBSERVATORY.—Father Sidgreaves's report of the meteorological and magnetical observations made at Stonyhurst during 1911 contains the usual tabular summaries with a few notes on the more important points. The observations of sun-spots and of magnetic declination point to 1911 being a minimum epoch for each, but later observations must be awaited to fix this point with certainty.

PHOTOGRAPHS OF HALLEY'S COMET.—The first fascicule of vol. v. of the *Annales de l'Observatoire astronomique de Tokyo* is devoted to Halley's comet as observed at Dairen, Manchuria, during the months April–June, 1910, by MM. Sotome and Hoasi; photographs taken at Tokyo by M. Toda are also included. The form, changes, and length of the tail and the acceleration of its particles are discussed at length, and there are nineteen plates of excellent reproductions of photographs, 131 in all, at the end of the work.

CYCLES OF THE SUN AND WEATHER.

SINCE Sir William Herschel suggested that variations in the visible changes of the sun's surface might be sensibly reflected in the meteorology of our planet, many investigators of high authority have endeavoured to determine the precise nature of the relationship between solar and terrestrial phenomena. In the seventies of last century it was decisively shown that the variation of certain meteorological elements coincided with that of photospheric activity as revealed by observations of sun-spots. The conclusions arrived at were expressed very definitely by Prof. A. Schuster in a paper presented to the meeting of the British Association in 1884. "There can," he said, "be no longer any doubt that during about four sun-spot periods (1810 to 1860) a most remarkable similarity existed between the curves representing sun-spot frequency and the curves of nearly every meteorological element which is related to temperature. This is not, in my opinion, a matter open to discussion: it is a fact."

But though a connection was established, further studies of its character seemed to lead to contradictory conclusions. High air temperatures were